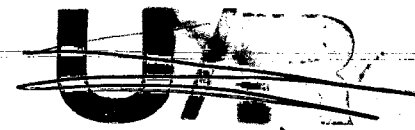


Work Order ID 81516

81516



March-15-12 8:42:37 AM

Page 1

Item ID: D350-748-101

Accept

N9000040100

Setup Start *NS1*

Revision ID: ~~U/R~~

Item Name: Crosstube Installation, High Fwd

Stop *NS2*

Start Date: 15/03/2012 Start Qty: 1.00 *1*

Cust Item ID:

Required Date: 04/04/2012 Req'd Qty: 1.00 *1*

Customer:

Reference:

Approvals: Process Plan: MLJ

Date: 12/03/15 Tooling:

Date:

Run Start *NR1*

QC: _____

Date: _____ SPC (Y/N): _____

Date: _____

Stop *NR2*

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
--------------------------------	--------------------------	----------------------	---------	--------	--------------	---------------	---------------	------------------	----------------

Draw Nbr	Revision Nbr								
D350-748-141	F U R <u>OK</u> <u>12-03-15</u>								
100	DOCUMENT CONTROL	0.00							
100									
DC	Memo	0.00							
Document Control	Photocopy bluefile & type labels per PPPD350-748-101		CHG002						

110	BENDING MACHINE - CROSSTUBES	0.00							
110									
CNC Bend 1	Memo	0.00							
CNC Delta 100 Bender	Bend tube as per Dwg D350-748-141 using CNC bender program D350F and Folio FT _____								

120	QC15- Crosstube Dimensional Check	0.00							
120									
QC	Memo	0.00							
Quality Control									

W 12 06 25

12-5-9

8.705/16

CL 12/05/10 ①

Purch. use p/o to meter 70.16942

used + inspect attached c/c to W/O

14/4/13

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

*March-15-12 8:42:37 AM

Item ID: D350-748-101

Accept

N900040100

Setup Start *NS1*

Revision ID: U/R

Item Name: Crosstube Installation, High Fwd

Stop ***NS2***

Start Date: 15/03/2012 **Start Qty:** 1.00

*** 1 ***

Cust Item ID:

Required Date: 04/04/2012 **Req'd Qty:** 1.00

*** 1 ***

Customer:

Reference:

Approvals: _____ **Process Plan:** _____ **Date:** _____ **Tooling:** _____ **Date:** _____

Run Start *NR1*

QC: _____ Date: _____ SPC (Y/N): _____ Date: _____

Stop *NR2*

Sequence ID/
Work Center ID

Operation Description

Set Up/ Run Hours

Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
---------	--------	-----------	------------	------------	---------------	-------------

125

0.00

125

0.00

HandFXtube

Memo

Stress relief

Heat treat crosstube as per QSI010 4.3

Temp: /

Start time: 7

Finish time: 7

127

QC6- Inspect dimensions to drawing

0.00

127

0.00

QC

Memo

Quality Control

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

Work Order ID 81516***81516***

Page 3

March-15-12 8:42:37 AM

Item ID: D350-748-101

Accept

N9000040100Setup Start ***NS1***

Revision ID: U/R

Stop ***NS2***

Item Name: Crosstube Installation, High Fwd

Start Date: 15/03/2012 Start Qty: 1.00

1

Cust Item ID:

Required Date: 04/04/2012 Req'd Qty: 1.00

1

Customer:

Reference:

Approvals: Process Plan: Date: Tooling: Date:

Run Start ***NR1***

QC: Date: SPC (Y/N): Date:

Stop ***NR2***

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
130	Crosstubes	0.00							
130									
Crosstubes	Memo	0.00							
Crosstubes	1-Drill Tube as per Dwg D350-748-141 Using DT8876 A,B & C Drill Jigs, Set-up drill table as per QSI 010								
	2-Deburr								
	3-Engrave Part # and Batch # as per Dwg D350-748-141								
	4-Remove all marks from tube within limits of D350-748-141								
	5- Apply a light coat of LPS3 on the interior of tube Batch: <u>h/198</u>								
140	QC5- Inspect part completeness to step on W/O	0.00							
140									
QC	Memo	0.00							
Quality Control	CHECK 10 DEG HOLES WITH DT8876E (EUROCOPTER CLAMP)								

12-5-22

12-5-23

8/12/10/30

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			
58-2-1								
85-2-1								

NOTE: Date & initial all entries

Work Order ID 81516

81516

Page 4

March-15-12 8:42:37 AM

Item ID: D350-748-101

Accept

N900040100

Setup Start ***NS1***

Revision ID: U/R

Item Name: Crosstube Installation, High Fwd

Stop ***NS2***

Start Date: 15/03/2012 Start Qty: 1.00

1

Cust Item ID:

Required Date: 04/04/2012 Req'd Qty: 1.00

1

Customer:

Reference:

Approvals:

Process Plan:

Date:

Tooling:

Date:

Run Start ***NR1***

QC:

Date:

SPC (Y/N):

Date:

Stop ***NR2***

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
150	Outsource process-Cadplate per QSI017 4.1.9.1	0.00							
150									
Outsource3	Memo	0.00							
Outsource process - Cad plate	Issue P/O: <u>17044</u> Stress relief at 375° for 5 hours Magnetic Particle Inspect per ASTM E1444 Cadium Plate per AMS-QQ-P-416B, Class 1, Type 2 Embrittle relief at 375° for 8 hours, Chromate Treat Possible Supplier: Southwest United Industries Ensure Certificate of Conformity is attached								<u>CL 12/04/10 4</u> ①
160	Receive & Inspect for Damage & Mat'l Certs	0.00							
160									
Packaging	Memo	0.00							
Packaging	Ensure certificate of conformity is attached								<u>12/14/10 10</u> <u>W/1/10</u> e
170	QC5- Inspect part completeness to step on W/O	0.00							
170									
QC	Memo	0.00							
Quality Control									

★

Enbels

★ SER WID CHG, OVER

FC

5

12.03.15

OP 12/16/26

Dart Aerospace Ltd

W/O:		WORK ORDER CHANGES						
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector	
12.03.15	171	LOAD TEST TO 3500 ^{lb} FOR 1 MINUTE		GP 12/16/18	1	GP 12.03.15 DS/0410	GP 12/06/26	
12.03.15	172	MDT P1017258 C&L 12/06/19 Rec'd [Signature]				GP 12.03.15 DS/0410	GP 12/06/26	

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

Work Order ID 81516

81516

Page 5

March-15-12 8:42:37 AM

Item ID: D350-748-101

Accept

N900040100

Setup Start

NS1

Revision ID: U/R

Item Name: Crosstube Installation, High Fwd

Stop

NS2

Start Date: 15/03/2012 Start Qty: 1.00

1

Cust Item ID:

Required Date: 04/04/2012 Req'd Qty: 1.00

1

Customer:

Reference:

Approvals:

Process Plan:

Date:

Tooling:

Date:

Run Start

NR1

QC:

Date:

SPC (Y/N):

Date:

Stop

NR2

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
180		0.00							
180	SprayPaint								
SprayPaint	Memo	0.00							
Spray Painting	1-Prime inside crosstube as per QSI 005 4.2 - B121746 start: 12:30 2-Prime Outside of Tube as per Dart QSI 005 4.2 - B121625 Finish: 1:15 start: 5:15 Finish: 5:45								
190	QC14- Inspect Spray Paint	0.00							
190									
QC	Memo	0.00							
Quality Control	Then, Wrap in plastic bag to protect from scratches								
200		0.00							
200	Crosstubes								
Crosstubes	Memo	0.00							
Crosstubes	1-Install Ground wire Insert, then insert screw and washer 2-Install Abraison strips as per Dwg D350-748-141 & QSI 035. 3-Install supports Using Dt8876 as per Dwg D350-748-141, Torque to 60-80 IN-LBS								

12-6-21

120624

120624

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

81516

Page 6

N900040100

Setup Start *NS1*

Stop *NS2*

*** 1 ***

Cust Item ID:

*** 1 ***

Customer:

Reference:

Run Start *NR1*

Stop *NR2*

QC: _____ Date: _____ SPC (Y/N): _____ Date: _____

[illegible]

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

Work Order ID 81516***81516***

Page 7

* March-15-12 8:42:37 AM

Item ID: D350-748-101

Accept

N900040100Setup Start ***NS1***

Revision ID: U/R

Stop ***NS2***

Item Name: Crosstube Installation, High Fwd

Start Date: 15/03/2012 Start Qty: 1.00

1

Cust Item ID:

Required Date: 04/04/2012 Req'd Qty: 1.00

1

Customer:

Reference:

Approvals: Process Plan: _____ Date: _____ Tooling: _____ Date: _____

Run Start ***NR1***

QC: _____ Date: _____ SPC (Y/N): _____ Date: _____

Stop ***NR2***

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
240		0.00							
240	Packaging								
Packaging	Memo	0.00							
Packaging	Identify and pack for shipping as per PPP D350-748-101								
	Location: _____								
	PPP Rev: _____								
250	QC21- Final Inspection - Work Order Release	0.00							
250									
QC	Memo	0.00							
Quality Control									

IX

Sp
12-6-25

MLJ 12/06/26

MK

1206-25

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

Picklist Print

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Page 1

Work Order ID: 81516

81516

Parent Item: D350-748-101

D350-748-101

Parent Item Name: Crosstube Installation, High Fwd

Start Date: 15/03/2012

Required Date: 04/04/2012

Start Qty: 1.00

Required Qty: 1.00

Comments:

IPP Rev:A New Issue 06-07-05 JLM
 IPP Rev:B Update qty of MS21042L5 06-09-12 KJ
 IPP Rev:C Rev B 07-11-15 DD
 IPP Rev D Combined manufacturing 08.04.02 EC verified by: DD
 IPP Rev:E 08-06-24 revD as per dwg DD verified by:EC IPP Rev:F
 10.08.04 added QSI010 4.3 DD verf:EC

Component Item ID/ Item Name	Replacement Item ID	Mfg/ Purch	Bin Item	Primary Location	Last Location	Route Seq ID	Unit of Measure	Qty on Hand	Qty per Kit	Total Qty	Qty Issued	Date Issued	Status
D350-748-141TRN		Manufactured	No		B74712	110	Each	0.0000	1	1			
D350-748-141TRN									**				
Crosstube Turning Detail													
ALS4-1032-225		Purchased	No			200	Each	1,102.000	1	1			
AI S4-1032-225									**				
Insert													

Location

Loc Qty

Loc Code

ST281

1019

108696

146

110768

62

118386

55

118966

68

120671

688

ST282

83

120410

70

120451

13

AN960JD10

NAS1149D0363J Purchased

No

200

Each

0.0000

1

1

AN960.ID10

Washer

**

121524

12120624

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

Picklist Print

March-15-12 8:42:41 AM

Page 2

Work Order ID: 81516

Parent Item: D350-748-101

Parent Item Name: Crosstube Installation, High Fwd

81516

D350-748-101

Start Date: 15/03/2012

Required Date: 04/04/2012

Start Qty: 1.00

Required Qty: 1.00

D2856-400 Manufactured No

200 f

199.5445 1.181 1.243158

D2856-400

Abrasion Strip

**

M/12 06 24

Location

Loc Qty

Loc Code

ST409

199.5445

63735

0.6696

68076

0.3149

71164

8.46

79551

190.1

81875

D3502-1 Manufactured No

200 Each

39.0000 2 2

D3502-1

Support

**

M/12 06 24

Location

Loc Qty

Loc Code

ST051

39

73419

19

74873

20

77041

MS21920-20 Purchased No

200 Each

60.0000 2 2

MS21920-20

Clamp (per MIL-DTL-8783C)

**

M/12 06 24

Location

Loc Qty

Loc Code

LG050

60

116799

8

120475

2

120676

50

121274

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

Picklist Print

March-15-12 8:42:41 AM

Work Order ID: 81516

81516

Parent Item: D350-748-101

D350-748-101

Parent Item Name: Crosstube Installation, High Fwd

Start Date: 15/03/2012

Required Date: 04/04/2012

Start Qty: 1.00

Required Qty: 1.00

MS27039-1-10

Purchased

No

200

Each

258.0000

1

1

MS27039-1-10

Screw

**

12/06/24

122027

Location

Loc Qty

Loc Code

GA

100

120449

100

ST291

158

120120

158

AN4-41A

Purchased

No

220

Each

387.0000

8

8

AN4-41A

Bolt

**

8

Location

Loc Qty

Loc Code

ST360

387

115108

3

115705

7

117619

27

118451

50

118838

50

119328

100

120423

150

8

AN4-6A

Purchased

No

220

Each

1,649.000

16

16

AN4-6A

Bolt

**

12/10/228

Location

Loc Qty

Loc Code

ST356

1649

119017

1649

16

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

Picklist Print

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Page 4

Work Order ID: 81516

81516

Parent Item: D350-748-101

D350-748-101

Parent Item Name: Crosstube Installation, High Fwd

Start Date: 15/03/2012

Required Date: 04/04/2012

Start Qty: 1.00

Required Qty: 1.00

AN5-32A Purchased No

220 Each 256.0000 4

AN5-32A

**

Bolt

Location

Loc Qty

Loc Code

ST339

256

119328

100

119862

50

120423

75

120717

1

120910

30

AN960JD416 NAS1149D0463J Purchased

No

220 Each 14.0000 32

AN960.ID416

**

Washer

Location

Loc Qty

Loc Code

ST351

14

116289

14

AN960JD516 NAS1149D0563J Purchased

No

220 Each 0.0000 8

AN960.ID516

**

Washer

D3500-1 Manufactured

No

220 Each 35.0000 4

D3500-1

**

Saddle

Location

Loc Qty

Loc Code

ST424

35

73406

8

76000

27

March-15-12 8:42:42 AM

Shop Packet Print

Page 4

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

Picklist Print

March-15-12 8:42:42 AM

Page 5

Work Order ID: 81516

81516

Parent Item: D350-748-101

D350-748-101

Parent Item Name: Crosstube Installation, High Fwd

Start Date: 15/03/2012

Required Date: 04/04/2012

Start Qty: 1.00

Required Qty: 1.00

D3501-1

Manufactured No

220 Each

361.0000

16 16

D3501-1

Bushing

**

385414

Location

Loc Qty

Loc Code

ST051

361

67757

4

70682

83

73391

6

74866

207

77033

61

MS21042L4

Purchased No

220 Each

5,585.000

24 24

MS21042L 4

Nut

**

m12144 us

Location

Loc Qty

Loc Code

ST300

5585

117441

51

117601

157

117885

16

118451

133

119017

232

119075

2996

121011

2000

MS21042L5

Purchased No

220 Each

1,602.000

4 4

MS21042L 5

Nut

**

12/6/22

Location

Loc Qty

Loc Code

ST300

1602

116105

5

116548

43

117611

42

118179

12

119109

1500

March-15-12 8:42:42 AM

Shop Packet Print

Page 5

Dart Aerospace Ltd

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

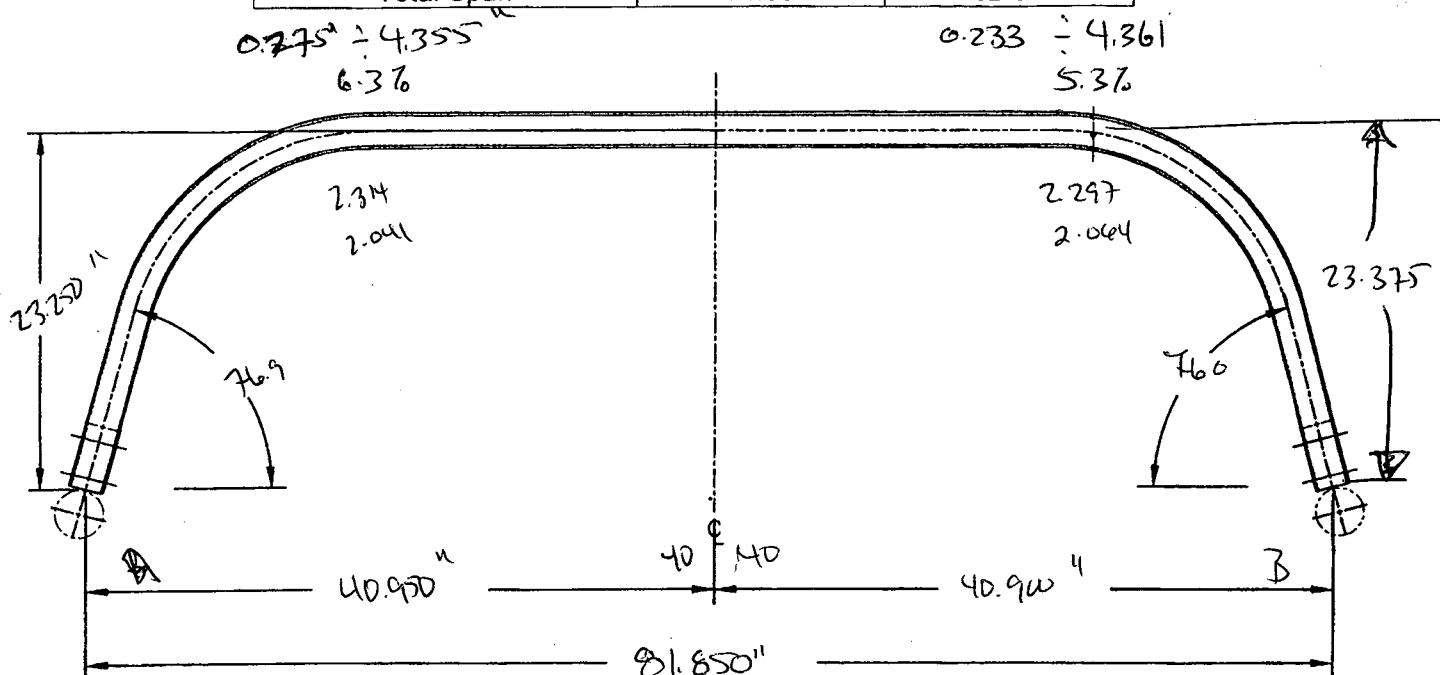
Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

DART AEROSPACE LTD	Work Order:	81516
Description: Crosstube High Fwd (AS350/355)	Part Number:	D350-748-101
Inspection Dwg: D350-748-141	Rev: F	Page 1 of 1

Required Dimension	Min	Max
Height	23.13	23.37
1/2 Span	40.78	41.02
Angle	75	77
Total Span	81.56	82.04



Comments
Side A = 6.3% crushing @ 40 Passes
Side B = 5.3% crushing @ 40 Passes
Twist = 0.368"
Acceptable @ 12.05.10 [Signature]

QC15 Inspection	[Signature]
Date	17/10/10

Rev	Date	Change	Revised by	Approved
A	07.02.06	New Issue	KJ/JM	
B	10.08.23	Dwg Rev updated	KJ	
C	11.11.07	Dwg Rev updated	KJ	[Signature]

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

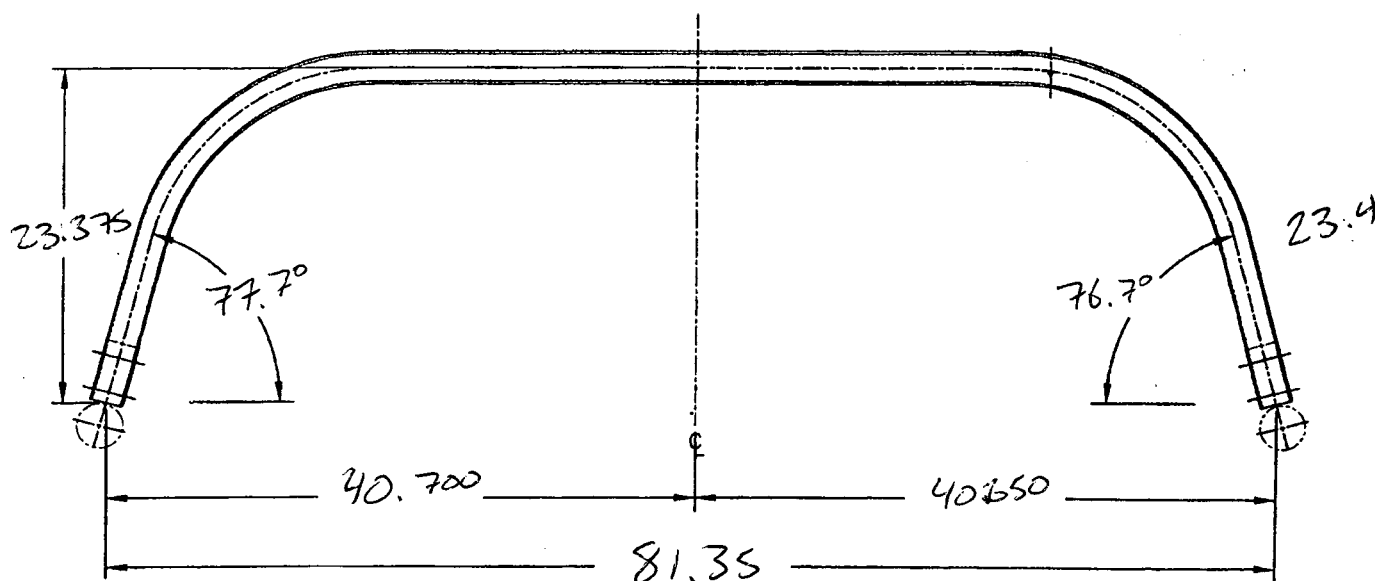
Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

DART AEROSPACE LTD	Work Order: 81516
Description: Crosstube High Fwd (AS350/355)	Part Number: D350-748-101
Inspection Dwg: D350-748-141 Rev: F	Page 1 of 1

Required Dimension	Min	Max
Height	23.13	23.37
1/2 Span	40.78	41.02
Angle	75	77
Total Span	81.56	82.04



MDO 12-5-17

Comments
Twist = 0.090
Acceptable CP 12.05.17 Q51042

QC15 Inspection	8
Date	12/6/17

Rev	Date	Change	Revised by	Approved
A	07.02.06	New Issue	KJ/JM	
B	10.08.23	Dwg Rev updated	KJ	
C	11.11.07	Dwg Rev updated	KJ	

Item	Qty -141	Part Number	Description
1	X	D350-748-141	CROSSTUBE ASSEMBLY (AS 350/355 HI FWD)
2	1	D6015-125	CROSSTUBE (OR D6017-115)
3	2	D3502-1	SUPPORT
4	2	D2856-400-710	ABRASION STRIP
5	1	AELS-1032-225	INSERT
6	1	NAS1149D0363J	WASHER (OR AN960JD10)
7	2	MS21920-20	CLAMP (PER DART SPEC. M-MS21920-20)
8	1	MS27039-1-10	SCREW

GENERAL NOTES:

- 1) MATERIAL: MANUFACTURED FROM D6015-125 OR D6017-115
FINISHED LENGTH = 110.270±0.06
- 2) FINISH: MAGNETIC PARTICLE INSPECT PER DART QSI 038 4.2
CADMIUM PLATE PER AMS-QQ-P-416B, CLASS 1, TYPE II
PRIME INSIDE AND OUTSIDE PER DART QSI 005 4.2
PAINT OUTSIDE PER DART QSI 005 4.2
- 3) TOLERANCES ARE PER DART QSI 018 UNLESS OTHERWISE NOTED.
- 4) UNITS: INCHES UNLESS OTHERWISE NOTED.
- 5) BREAK SHARP EDGES: 0.005 TO 0.010 MAX.
- 6) IDENTIFICATION: DART PART NUMBER "D350-748-141" AND BATCH NUMBER ON INSIDE OF CUFF
PER DART QSI 044 6.4 (VIBRATING STYLUS)
- 7) WEIGHT: 30.45 lbs
- 8) PART IS SYMMETRIC ABOUT CENTERLINE, EXCEPT FOR Ø0.297 HOLE.
- 9) BLEND OUT ALL EDGES FROM MACHINING LONGITUDINALLY, TRANSITION SHOULD BE SMOOTH.
NOTE: ALL HOLES ARE DRILLED AFTER BENDING.
- 10) BEND PROGRESSIVELY WITH A MINIMUM OF 7 PASSES. MAXIMUM TUBE FLATTENING DUE TO
BENDING IS 6% BASED ON O.D.
- 11) HEAT TREAT TO MIN. 180 KSI PER MIL-T-6736 OR AMS 2759-1C AFTER TURNING. ACCEPTABLE TO
VERIFY TENSILE STRENGTH BY HARDNESS TEST PER ASTM E18 TO 40-45 HRC.
- 12) INSTALL D2856-400-710 ABRASION STRIPS WITH A GAP ON BOTTOM SIDE OF CROSSTUBE,
CENTERED OPPOSITE D3502-1 SUPPORT, PER QSI 035.
- 13) EXTREME CARE MUST BE TAKEN TO PROTECT THE OUTSIDE SURFACE OF THE TUBE. THE
OUTSIDE SURFACE MUST BE SMOOTH AND FREE FROM SURFACE DEFECTS SUCH AS SCRATCHES,
NICKS, OR DENTS. DEFECTS UP TO 0.005" MAY BE BLENDED OUT LONGITUDINALLY.
CIRCUMFERENTIAL GRIND MARKS ARE UNACCEPTABLE. WHEN DRILLING HOLES EXTREME CARE
MUST BE TAKEN AND CAREFUL DEBURRING PERFORMED TO ENSURE A CLEAN HOLE WITH NO
CRACKING/CHIPPING/GROOVES.
- 14) TORQUE CLAMPS 60 TO 80 IN-LB. ENSURE AT LEAST 1.5 THREADS SHOWING IN SAFETY AND THAT
NUT HAS NOT BOTTOMED-OUT AFTER TORQUING.
- 15) MAX TWIST AFTER BENDING: WITH XTUBE LAYED FLAT ON SURFACE, THE DIFFERENCE BETWEEN
CUFF HEIGHTS FROM THE SURFACE MAY BE NO LARGER THAN 0.25 (ZN C1-3).

SHOP COPY
RETURN TO
ENGINEERING
UNCONTROLLED COPY
SUBJECT TO AMENDMENT
WITHOUT NOTICE
WORK ORDER
NO. 81516 MCT

12/03/15

UNDER REVIEW

11.07.12

RELEASED
2011-01-18

F	ADD HRC TEST OPTION (B8-1) PER PAR 09-040, ADD TWIST LIMIT (A8-1, C1-3), ADD D6015-125 OPTION (C8-1), STOCK DIM NOW MACHINED (D1-4)	CP	10.11.23
E	REVISE GENERAL NOTES; UPDATE TO CURRENT ADD STANDARDS; RELOCATED FLAG #6 PER PAR 08-046 (ZN A6-3); TOLERANCES (ZN C6-3, D1-3)	RF	09.09.30
D	MAG. PARTICLE AND CAD PLATE AS MFD.	CP	06.10.31
C	ADD CAD PLATING	CP	06.08.14
B	ADD D6017-115 & PRIME AND PAINT	CP	06.06.30
A	NEW ISSUE	CP	06.03.31
REV.	DESCRIPTION	BY	DATE
DESIGN	97		
DRAWN	97		
CHECKED	97		
MFG. APPR.	97		
APPROVED	97		
DE APPR.	97		
DATE	10.11.23		

DART AEROSPACE LTD HAWKESBURY, ONTARIO, CANADA	
DRAWING NO. D350-748-141	REV. F SHEET 1 OF 4
TITLE CROSSTUBE (AS 350/355 HI FWD)	SCALE NTS
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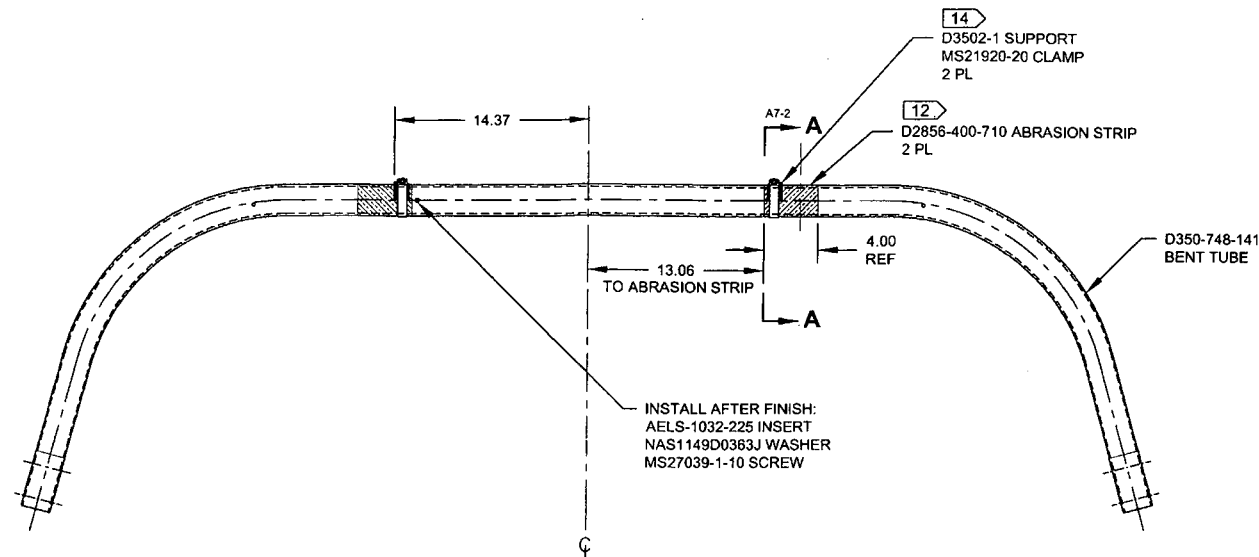
W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

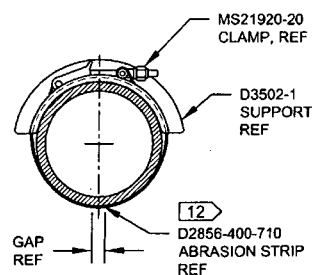
Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries



**D350-748-141
ASSEMBLY DETAIL**



**SECTION A-A D4-2
SCALE 4X**

UNDER REVIEW

11.07.11

RELEASED
2011-01-19

DESIGN	97	DART AEROSPACE LTD	
DRAWN	97	HAWKESBURY, ONTARIO, CANADA	
CHECKED	97	DRAWING NO.	REV.
MFG. APPR.	97	D350-748-141	SHEET 2 OF 4
APPROVED	97	TITLE	SCALE
DE APPR.	97	CROSSTUBE (AS 350/355 HI FWD)	NTS
DATE	10.11.23	COPYRIGHT © 2006 BY DART AEROSPACE LTD	
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W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

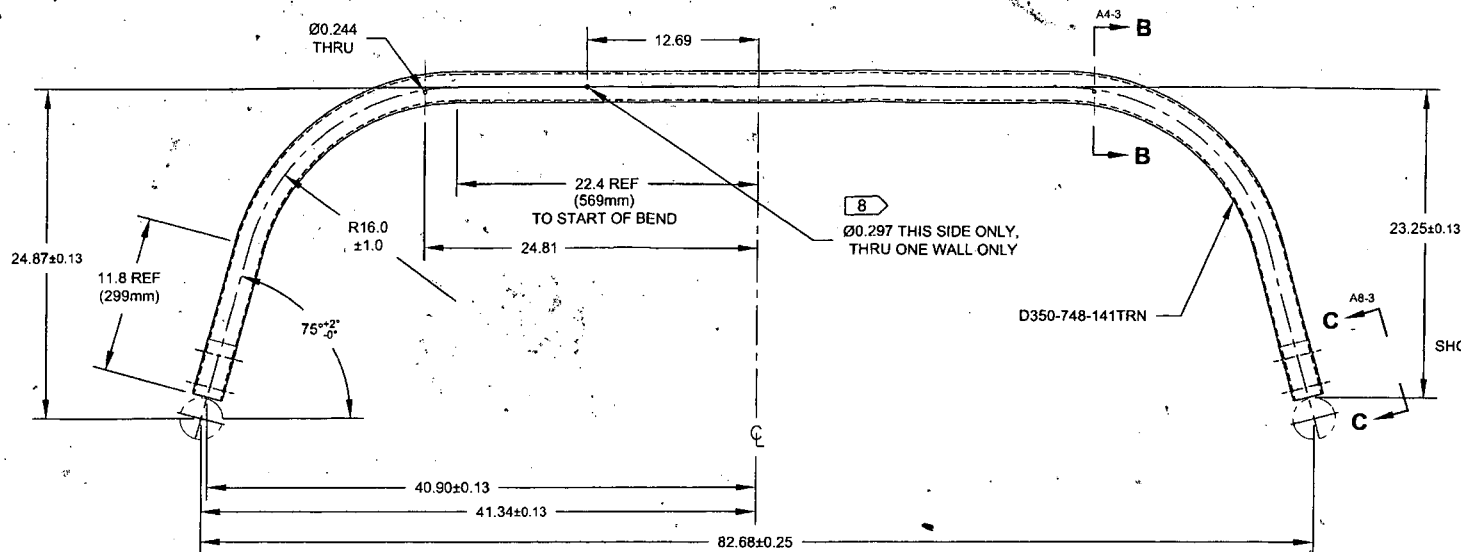
Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

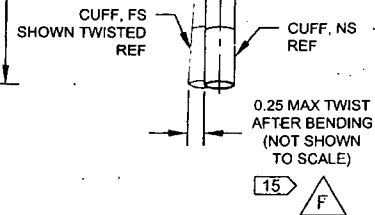
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DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

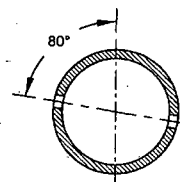
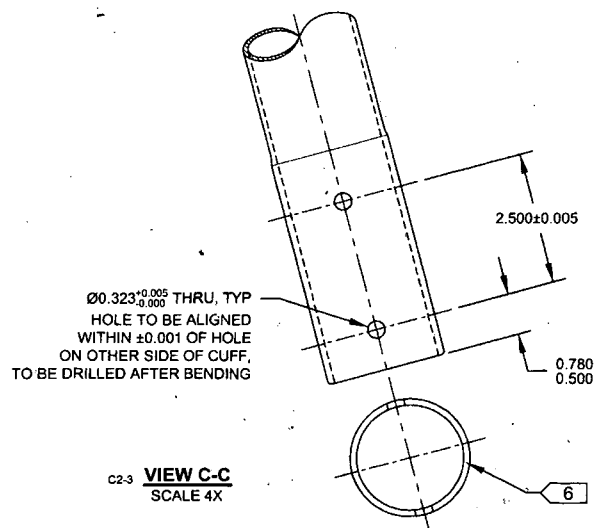
8 7 6 5 4 3 2 1



Ø1516



D350-748-141
BENDING AND DRILLING DETAIL 10



SECTION B-B D3-3
SCALE 4X

UNDER REVIEW
11.07.12

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2011-01-18

DESIGN	97	DART AEROSPACE LTD	
DRAWN	97	HAWKESBURY, ONTARIO, CANADA	
CHECKED	97	DRAWING NO.	REV. F
MFG. APPR.	97	D350-748-141	SHEET 3 OF 4
APPROVED	97	TITLE	SCALE
DE APPR.	97	CROSSTUBE (AS 350/355 HI FWD)	NTS
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8 7 6 5 4 3 2 1

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

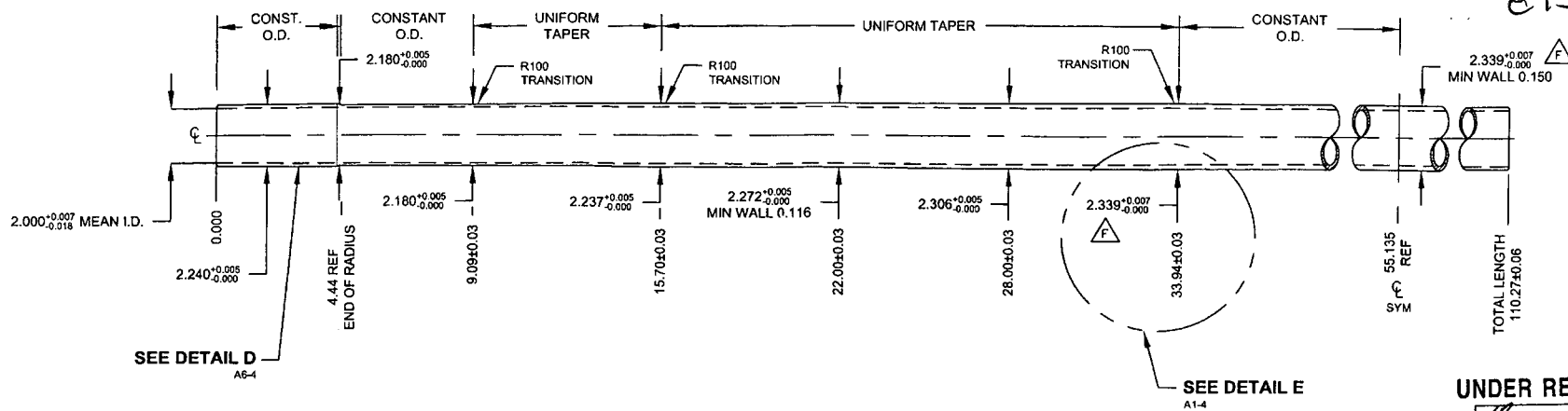
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NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

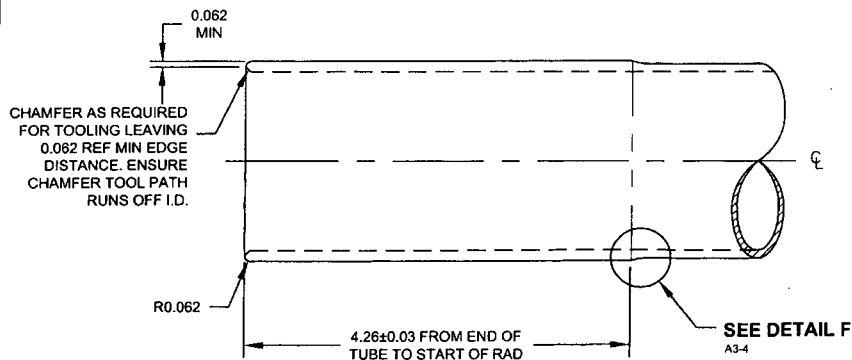
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01516

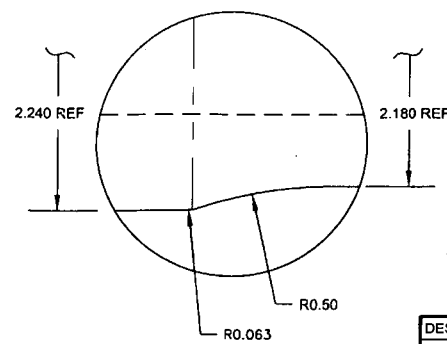


**D350-748-141TRN
TURNING DETAIL**

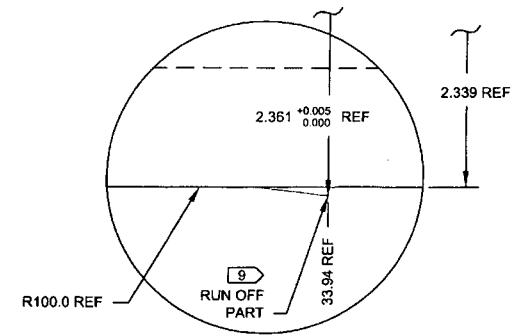
UNDER REVIEW
11.07.12



**DETAIL D:
CROSSTUBE CUFF** C7-4
SCALE 3X



**DETAIL F:
CUFF TRANSITION** A5-4
NOT TO SCALE



**DETAIL E:
TAPER RUN-OFF** C3-4
NOT TO SCALE

RELEASED
2011-01-18

DESIGN	qp	DART AEROSPACE LTD HAWKESBURY, ONTARIO, CANADA	
DRAWN	qp		
CHECKED	js	DRAWING NO.	REV. F
MFG. APPR.	js	D350-748-141	SHEET 4 OF 4
APPROVED	js	TITLE	SCALE
DE APPR.	js	CROSSTUBE (AS 350/355 HI FWD)	NTS
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W/O: -		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

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DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

METCOR INC.
560 BOUL. ARTHUR-SAUVÉ
ST-EUSTACHE, QC, J7R 5A8
 Tel: 450-473-1884 / Fax: 450-491-5498

Certificat de Conformité Détaillé
 Detailed Certificate of Compliance

BON DE TRAVAIL order	CHARGEMENT load
175881	1

CLIENT / customer 215

DART AEROSPACE
 1270 ABERDEEN
 HAWKESBURY

ON K6A 1K7

LIVRÉ À / shipped to:

DART AEROSPACE
 1270 ABERDEEN
 HAWKESBURY

ON K6A 1K7

COMMANDE DU CLIENT customer po	BON DE LIVRAISON DU CLIENT customer shipper no.	MATÉRIEL material	CODE DE TRAITEMENT mat'l heat code	NUMÉRO DE LOT lot number
16942		Steel		

SPÉCIFICATIONS DU PROCÉDÉ
 processing specifications

STRESS REL

SAE AMS 2759/1 REV.E

EXIGENCE / requirement	SPÉCIFICATIONS / specified	TESTS EXÉCUTÉS / performed	RÉSULTATS DE TESTS / results
Visual			

QUANTITÉ quantity	POIDS weight	DESCRIPTION DES PIÈCES parts description
7	210	D350-748-101 (1) CROSSTUBE (1) D350-748-101 CROSSTUBE (1) D350-748-201 CROSS TUBE (1) D350-748-201 CROSS TUBE (1) D350-748-201 CROSS TUBE (1) D350-748-201 CROSS TUBE (1) D350-748-201 CROSS TUBE CONTENANT: 1 PALETTE

Operation	Temp. spécifiée Specified Temp	Temps de trempage Spécifié Specified Soak Temp	Atmosphère	Carbone Carbon Potential	Q-Media Q-Temp	Four # Furnace #	Date Départ Start Date	Heure d'entrée Time In	Heure de sortie Time Out	Date Complétée Date complete
1,00 CONT. INIT.	LAVAGE		si nécessaire							

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 560 BOUL. ARTHUR-SAUVÉ
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 Tel: 450-473-1884 / Fax: 450-491-5498

Certificat de Conformité Détaillé
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BON DE TRAVAIL order	CHARGEMENT load
175881	1

CLIENT / customer 215

DART AEROSPACE
 1270 ABERDEEN
 HAWKESBURY

ON K6A 1K7

LIVRÉ À / shipped to:

DART AEROSPACE
 1270 ABERDEEN
 HAWKESBURY

ON K6A 1K7

Operation	Temp. spécifiée Specified Temp	Temps de trempage Spécifié Specified Soak Temp	Atmosphère	Carbone Carbon Potential	Q-Media Q-Temp	Four # Furnace #	Date Départ Start Date	Heure d'entrée Time In	Heure de sortie Time Out	Date Complétée Date complete
2,00 PREPARINC	COMPTAGE									
3,00 STRESS RE	650	2 hrs 30 minutes	air			701				
4,00 FINAL INSP							05-11-2012			05-11-2012

COMMENTAIRES / comments

ALL THE HEAT TREATMENT PROCESSING PERFORMED ON THIS ORDER WAS ACCOMPLISHED USING HEAT TREATMENT EQUIPEMENT THAT MEETS THE REQUIREMENTS OF AMS 2759. ALL THE HEAT TREATMENT OPERATIONS WERE ACCOMPLISHED IN ACCORDANCE WITH THE REQUESTED/REQUIRED HEAT TREATMENT SPECIFICATION AND ALL REQUIRED VERIFICATIONS TEST HAVE BEEN PERFORMED AND DOCUMENTED. NO UNAUTHORIZED CHANGES OR DEVIATIONS TO REQUIRED HEAT TREATMENT SPECIFICATIONS OR PROCEDURES HAVE BEEN PERFORMED.

APPROUVÉ par / Approved by:

[Signature]



DATE: 2012-05-11

/ Nous certifions que toute l'information comprise sur ce rapport est exacte et conforme aux requis du client./We certify that all the information on this report is exact and in accordance with the order requirements.

**CERTIFICATE OF
CONFORMANCE**

**CADORATH PLATING CO. LTD.
2150 LOGAN AVENUE
WINNIPEG, MANITOBA R2J-0J1**

DATE: Jun-12-2012

CONSIGNED TO: Dart Aerospace Ltd.
1270 Aberdeen St.
Hawksbury, ON K6A 1K7

W/O #: 114968

INVOICE #: 60875

CONTRACT OR
PURCHASE ORDER # PO17084

DESCRIPTION: CROSSTUBE

QTY 1

P/N # d350-748-101

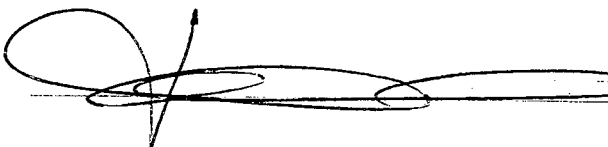

S/N # 81516

STRESS RELIEVE HEAT CHART # 12-546. MPI-IAW ASTM-E-1444.
CADMIUM PLATE IAW AMS-QQP-416C TYPE 2 YELLOW CLASS.
BAKE HEAT CHART # 12-573. MPI IAW ASTM-E1444.

Enlake

**CERTIFICATE: I certify that the items indicated here on have
been inspected and tested and conform to all specifications
and requirements detailed on the contract or purchase order.**

Approved Inspector:

Chris Provencal

From: David Shepherd <dshepherd@dartaero.com>
Sent: Tuesday, April 27, 2010 3:40 PM
To: 'Mike Petsche'
Cc: 'Bill Beckett'; 'L Lacelle'; 'Chris Provencal'; 'Dan Stow'; ssheldon@dartaero.com
Subject: 350 crosstubes

Mike,

I discussed the 350 crosstube load testing with Bill a little while ago and this plan makes sense to him.

So, my recommendation to clear these crosstubes is to load the fwd crosstubes to 3500 lb and the aft crosstubes to 3000 lb in the deflection test rig and document on the work orders that this test has been completed. Hold max load for 1 minute. Per TP-D350-748-2, these loads represent the maximum load on these crosstubes at gross weight and are below the yield point of the material. I would like to request that Chris Provencal witness these tests and sign off the work orders based on his experience with Dart landing gears. My feeling is that if there is a problem with the parts, it will manifest itself during this load test. I, for one, would feel a lot more confident in testing each crosstube in this manner than relying totally on what Exova has to say. I think it would be very difficult to reach a conclusion on the whole batch on the basis of cracks in two parts from the batch.

I believe that we can accomplish this before next Friday, which also gives us time to hear what Exova has to say in case it has an impact on our decision. So far, what I have seen from Exova shows me that there are fluctuations in the heat treating but the tubes are heat treated to our specification.

For this reason, I believe we should tell DHS that it looks like we will be able to start shipping 350 crosstubes by May 7th pending a successful Engineering test of the material.

David.



LIQUID PENETRANT TEST REPORT

P- 12187..

CLIENT DART AEROSPACE DATE JUNE 19/2012 PAGE 1 OF 1
ATTENTION MATT / LINDA ACUREN JOB NO. 188-12-C0265 TIME AM ☒ PM ☐
ADDRESS 1270 ABERDEEN ST. PO/VO NO. 17084
HANKS BURY, ON. WORK LOCATION SAME
PROJECT F.P.I. ON CROSS TUBES ACCEPTANCE STD. ASTM 1417/01-038 REV./DATE 2005
ITEM(S) EXAMINED (6 PCS) SEE RESULTS

ITEM DESCRIPTION PROCEDURE NO. LT-0002 REV./DATE 2008 TECHNIQUE NO. LT-0002 REV./DATE 2008
ITEM NO. SEE RESULTS MATERIAL 4130 STEEL THICKNESS VARIOUS
COUPE + WET FLUORESCENT LIQUID PENETRANT
INSPECTION WAS DONE 100% ON THE EXTERNAL SURFACE ONLY

TEST DETAILS
METHOD ☒ FLUORESCENT ☐ VISIBLE ☒ WATER WASH ☐ SOLVENT REMOVABLE ☐ POST EMULSIFIED
FAMILY BRAND MAGNAFLUX BLACK LIGHT S/N 16459 OUTPUT > 1000 μ W/cm² ☐ AMBIENT < 2 fc
PENETRANT ZLO7 MINIMUM DWELL TIME 45 MIN. LIGHTING EQUIP. ☐ FLASHLIGHT ☐ TROUBLELIGHT ☐ OUTPUT > 100 fc @ SURFACE
PENETRANT REMOVER H2O MINIMUM DRY TIME > 10 MIN. OTHER LAB. NO
DEVELOPER SKD 52 MINIMUM DWELL TIME 10 MIN. LIGHT METER S/N 1098866 CAL DUE DATE
DEVELOPER TYPE ☒ NON AQUEOUS ☐ AQUEOUS ☐ DRY JUN 20-2012

TEST SURFACE
SURFACE CONDITION ☐ AS GROUND ☐ AS WELDED ☒ MACHINED ☐ SHOT BLASTED ☒ CLEAN BARE METAL
SURFACE TEMPERATURE ☐ < -4°C/ 20°F ☐ -4°C/ 20°F TO 10°C/ 50°F ☒ 10°C/ 50°F TO 52°C/ 125°F ☐ > 52°C/ 125°F
RESULTS- ☒ METRIC ☐ IMPERIAL

ITEM NO.	DESCRIPTION	RESULTS
1	CROSS TUBES	
1	83700	✓
1	83695	✓
1	83694	✓
1	84381	✓
1	81510	✓
1	83799	✓

12-06-18

Scope of Services
The agreement of Acuren Group Inc. to perform services extends only to those services provided for in writing. Under no circumstances shall such services extend beyond the performance of the requested services. It is expressly understood that all descriptions, comments and expressions of opinion reflect the opinions or observations of Acuren Group Inc. based on information and assumptions supplied by the owner/operator and are not intended nor can they be construed as representations or warranties. Acuren Group Inc. is not assuming any responsibilities of the owner/operator and the owner/operator retains complete responsibility for the engineering, manufacture, repair and use decisions as a result of the information provided by Acuren Group Inc. In no event shall Acuren Group Inc.'s liability in respect of the services referred to herein exceed the amount paid for such services.
Standard of Care
In performing the services provided, Acuren Group Inc. uses the degree, care and skill ordinarily exercised under similar circumstances by others performing such services in the same or similar locality. No other warranty, expressed or implied, is intended by Acuren Group Inc.

SIGNATURES
CLIENT REPRESENTATIVE Matthew Murdoch PRINT Matthew Murdoch SIGNATURE
TECHNICIAN (SIGNATURE): Mike Johnson
NAME (PRINT): Mike Johnson 1ST TECHNICIAN
CGSB LEVEL E SNT LEVEL 6606 CGSB REG. NO. 6606
2ND TECHNICIAN
CGSB LEVEL SNT LEVEL CGSB REG. NO.
DTR # E-63501
REPORT REVIEWED BY: NAME INITIALS